

US EPA ARCHIVE DOCUMENT

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LGP-ENVIRONMENTAL SAFETY

DIBROM

I. INTRODUCTION

This review is for dibrom (Naled) as the sole active ingredient and in combination with Kelthane, or sulfus, or endosulfan, or captan, or folpet, or karathane. No additional fish and wild-life studies are needed for reregistration. For classification of dibrom see below.

II. ENVIRONMENTAL SAFETY DATA USEDA. Mammalian

Rat acute oral LD_{50} = 272 mg/kg^{1/}

B. Avian

Bobwhite LC_{50} = 2117 ppm^{2/}

Pheasant LC_{50} = 2538 ppm^{2/}

Mallard LC_{50} = 2724 ppm^{2/}

C. Aquatic

Rainbow 72-hr LC_{50} = 0.15 ppm^{3/}

Bluegill 96-hr LC_{50} = 0.18 ppm

III. ENVIRONMENTAL HAZARD CAUTIONSA. Dibrom (as the sole active ingredient)(1) Manufacturing Use (and Indoor Uses like Greenhouses):

"This pesticide is toxic to wildlife and fish.
Keep out of lakes, streams or ponds".

(2) Nonaquatic Outdoor Uses (except those in RPAR or which need clarification: see (C) and (VI) below)

(a) Emulsifiable Concentrates, Sprays, Dusts:

"This pesticide is toxic to wildlife and fish. Use with care when applying in areas frequented by wildlife or adjacent to any body of water. Birds and other wildlife in treated areas may be killed. Keep out of lakes, streams or ponds. Do not apply when weather conditions favor drift from target area".

These cautions should appear in the "Environmental Hazards" paragraph. If the label recommends mixing this pesticide with other pesticides, then a statement such as the following is necessary for the "Directions for Use" paragraph:

"Observe all cautions and limitations on labeling of all products used in mixtures".

(b) Granular Products: There appear to be no granular products registered.

B. Dibrom in combination with other actives

For dibrom formulations containing the active ingredients indicated in the Introduction refer to the appropriate environmental safety review for that chemical. A chemical more toxic than dibrom (such as endosulfan) will take precedence in environmental hazard cautions and in classification.

C. Other

(1) Uses in residential areas and municipalities:

Before classification and/or adequate labeling can be developed, directions for use of dibrom in municipalities and in residential areas must be more specific: i.e., for use along roadways, in garbage dumps, around parking lots. Further, all such uses must be nonaquatic and must not include areas in the RPAR Category unless suitable rebuttals (to presumption are presented and accepted. (see attached memo).

- (2) Certain labels indicate spraying turf and soil surfaces around flowers, shrubs and trees "for general pest cleanup". Actual application rates per given area are not always given but instead are usually expressed as amount of product (ounces, pints) per amount of carrier (pints, quarts, gallons of water). These labels should be handled as suggested in the attached memo or as indicated under classification below.

IV. Waivers

None required for reregistration.

V. Data Required for Registration/Renewal

None required for registration renewal.

VI. Classification/RPAR

A. General

All nonaquatic uses of naled are classified General except under the circumstances in (B) and (C) below.

B. RPAR

All aquatic uses of naled are classified RPAR. The following uses are considered definitely to be aquatic applications. These uses trigger acute RPAR based upon aquatic criteria. For rebuttal such uses will require extensive field monitoring studies and/or further clarification of the use pattern:

- (1) rice,
- (2) tidal marshes
- (3) swamps
- (4) woodlands
- (5) forest and shade trees: conifers and broadleaf trees.

Other uses may fall into RPAR depending upon clarification of the use site.

C. Restricted/RPAR

- (1) As indicated under (III) (C) (1) and (2) above certain use patterns need clarification as to rates of application and/or use sites. More specifically,:
 - (a) Uses of naled in municipalities and residential areas need clarification before classification.
 - (b) Any outdoor use of naled on ornamentals must specify use sites and application rates to be classified. Uses around the home can be considered for General classification if rates are <3.4# active ingredient/acre.
 - (c) Uses of naled in orchard situations (oranges, lemons, peaches etc.) are restricted when foliar applications (finished spray per acre) are >21.9# active ingredient/acre and are RPAR at ≥109.5# active ingredient/acre.
 - (d) Uses of naled in/or pastures, rangeland, lawns, and turf areas are restricted at rates of ≥1.75# active ingredient/acre and are RPAR at rates of ≥8.75# active ingredient/acre.

In reference to "transfer mechanisms" for naled, presently none are available until:

- (1) certain use patterns as indicated above are clarified, and/or
- (2) simulated field and/or field monitoring studies are performed.

Norman J. Cook *NJC*.
Environmental Safety Reviewer
August 11, 1976

CLASSIFICATION COMMENT - NALED

In the review of naled the most striking toxicity characteristics noted were those to aquatic organisms. (Naled also appears acutely toxic to avian species when oral intubation rather than dietary feeding is employed). Further, Naled's degradation product DDVP also is acutely toxic to aquatic organisms - even more so than naled - and is more toxic than naled to mammals and birds. Considering the relatively short 1/2-life of naled in soil (approx. 5 hours) and in water (24 hours or less) it is recommended that any future reviews of naled consider the degradation product DDVP and its potential effects on nontarget organism.

It is recommended also that avian and aquatic reproduction studies be obtained because of naled's wide usage, numerous applications and its use in or near aquatic sites.

Dibrom: Environmental Chemistry

A. "Rate of Hydrolysis of Naled in Aqueous Solution"

| <u>Half-life in Hours</u> | | | |
|---------------------------|-------------|-------------|-------------|
| <u>Temp.</u> | <u>pH 5</u> | <u>pH 7</u> | <u>pH 9</u> |
| 21°C | 24.9 | 15.9 | 0.27 |
| 37°C | 6.0 | 4.4 | 0.05 |

Rate of hydrolysis was more rapid at the basic pH and/or the higher temperature.

NOTE: No mention was made concerning sterility of water or exclusion of light.

B. 1/2 life in sterile sandy loam is 5 hours.

REFERENCES

- 1/ Acc. No. 050856 submitted by Chevron Chem. Co., Reg. No. 239-1721, Rec'd 2/28/74.
- 2/ Heath, Robert G., et. al., Lethal Dietary Toxicities of Environmental Pollutants to Birds, USDI, USFWS, Special Scientific Report - Wildlife No. 191, 1975.
- 3/ PP. No. 7F0532, Acc. No. 090646, Section C, Reference 28a, p.13, submitted by Chevron Chem. Co., Rec'd 9/20/66.
- 4/ Tucker, Richard K and D. Glen Crabtree, Handbook of Toxicity of Pesticides to Wildlife, BSFW, Denver Wildlife Research Center, Resource Publication No. 84, March, 1970.
- 5/ FWPCA. 1968. Water Quality Criteria. Report of the National Tech. Adm. Comm. to Secr. of the Interior. Fed. Water Pollution Contr. Adm. USDI. 234 p.
- 6/ Muncy, R. J., and A. D. Oliver. 1963. Toxicity of ten insecticides to the red crawfish, Procambarus clarki (Girard). Trans. Am. Fish. Soc. 92:428-431.
- 7/ Neumeyer, J.D. Gibbons and H. Trask. 1969. Pesticide Parts 1 and 2. Chemical Week 104 (April 12 and 26):37-68 and 37-68.
- 8/ Animal Biol. Lab., EPA-TSD, Test No. ?, July, 1968.

| PARAMETERS | ORGANISM | GENERAL | RESTRICTED | REBUTTABLE PRESUMPTION |
|------------|--|---|---|--|
| A | MAMMAL | < 1/5 LD ₅₀ | ≥ 1/5 LD ₅₀ to < LD ₅₀ | ≥ LD ₅₀ |
| | Rat ^{1/} | < 1/5 (272 mg/kg or 5440 ppm) = _____ : < 1088 ppm | > 1088 ppm to < 5440 ppm | > 5440 ppm |
| B | AVIAN | < 1/5 LC ₅₀ | ≥ 1/5 LC ₅₀ to < LC ₅₀ | ≥ LC ₅₀ |
| | (see over) | | | |
| B | Bobwhite ^{2/} | < 1/5 (2117 ppm) = < 423.4 ppm | > 423.4 ppm to < 2117 ppm | > 2117 ppm |
| | Pheasant ^{2/} | < 1/5 (2538) = < 507.6 ppm | > 507.6 ppm to < 2538 ppm | > 2538 ppm |
| C | AQUATIC* | < 1/10 LC ₅₀ | ≥ 1/10 LC ₅₀ to 1/2 LC ₅₀ | > 1/2 LC ₅₀ |
| | (see over) | | | |
| C | Rainbow ^{3/} | < 1/10 (.15 ppm) = < 0.015 ppm | ≥ 0.015 ppm to 0.075 ppm | > 0.075 ppm |
| | Bluegill ^{3/} | < 1/10 (0.18) = < 0.018 ppm | ≥ 0.018 ppm to 0.09 ppm | > 0.09 ppm |
| D | The pesticide causes, under conditions of label use, or widespread and commonly recognized practice of use, only minor and no discernible adverse effects on the physiology, growth, population levels, or reproduction rates of non-target organisms, resulting from exposure to the product ingredients, their metabolites or degradation products, whether due to direct application or otherwise resulting from application such as through volatilization, drift, leaching or lateral movement in soil. | | | Chronic Toxicity: Can reasonably be anticipated to result in significant local, regional, or national population reductions in non-target organisms, or fatality to members of endangered species. |

*used only in cases where "direct application" to water is intended. (See W. Preston's Memo of January 14, 1976.)

Chemical: Dibrom

CLASSIFICATION (Cont.)

A. Avian LD₅₀'s:

| ORGANISM | GENERAL | RESTRICTED | RPAR |
|--------------------------------------|--|----------------------------|---------------------------|
| Mallard ^{4/} | $<1/5(52.2 \text{ mg/kg}) =$ $<10.44 \text{ mg/kg}$ | $\geq 10.44 \text{ mg/kg}$ | $\geq 52.2 \text{ mg/kg}$ |
| Sharp-tailed ^{4/} Grouse | $<1/5(64.9 \text{ mg/kg}) =$ $<12.98 \text{ mg/kg}$ | $\geq 12.98 \text{ mg/kg}$ | $\geq 64.9 \text{ mg/kg}$ |
| Canada Geese ^{4/} | $<1/5(36.9 \text{ mg/kg}) =$ $<7.38 \text{ mg/kg}$ | $\geq 7.37 \text{ mg/kg}$ | $\geq 36.9 \text{ mg/kg}$ |

B. Aquatic LC₅₀'s

| ORGANISM | GENERAL | RESTRICTED | RPAR |
|----------------------------|---|----------------------------|------------------------|
| Brook Trout ^{5/} | $<1/10(0.078 \text{ ppm}) =$ $<0.0078 \text{ ppm}$ | $\geq 0.0078 \text{ ppm}$ | $>0.039 \text{ ppm}$ |
| Daphnia ^{5/} | $<1/10(0.0035 \text{ ppm}) =$ $<0.00035 \text{ ppm}$ | $\geq 0.00035 \text{ ppm}$ | $>0.00175 \text{ ppm}$ |
| Stone Fly ^{5/} | $<1/10(0.016 \text{ ppm}) =$ $<0.0016 \text{ ppm}$ | $\geq 0.0016 \text{ ppm}$ | $>0.008 \text{ ppm}$ |
| Red Crawfish ^{6/} | $<1/10(4.0 \text{ ppm}) =$ $<0.4 \text{ ppm}$ | $\geq 0.4 \text{ ppm}$ | $>2.0 \text{ ppm}$ |
| Amphipod ^{5/} | $<1/10(0.16 \text{ ppm}) =$ $<0.016 \text{ ppm}$ | $\geq 0.016 \text{ ppm}$ | $>0.08 \text{ ppm}$ |

Chemical DIBROM

RESIDUE CRITERIA - ENVIRONMENTAL

Rat LD₅₀ = 220 mg/kg
 Bird LC₅₀ = 2117 ppm
 Fish Daphnia LC₅₀ = 0.0035 ppm

APPLICATION RATE (LBS/A a.i.)

| FEED/WATER | MAMMAL | | | AVIAN | | | AQUATIC | | |
|---|---------|------------|-------|---------|------------|--------|----------|------------|--------|
| | General | Restricted | RPAR | General | Restricted | RPAR | General | Restricted | RPAR |
| <u>Foliar Application</u> | | | | | | | | | |
| Forage | <18.8 | >18.8 | >94 | <7.3 | >7.3 | >36.5 | | | |
| Leafy Crop | <8.8 | >8.8 | >44 | <3.4 | >3.4 | >17 | | | |
| Grass - Long | <9.5 | >9.5 | >47.5 | <3.85 | >3.85 | >19.25 | | | |
| Grass - Short | <4.5 | >4.5 | >22.5 | <1.75 | >1.75 | >8.75 | | | |
| XXXXXX Orchards: | <56.4 | >56.4 | >282 | <21.9 | >21.9 | >109.5 | | | |
| Forage X3 | | | | | | | | | |
| Trees | <158 | >158 | >790 | <62 | >62 | >310 | | | |
| XXXXXX Seeds, (POD) Insects | <92 | >92 | >460 | <36 | >36 | >180 | | | |
| <u>Soil Application</u> | | | | | | | | | |
| No Incorporation | | | | | | | | | |
| Granular (mg/ft ²) | | | | | | | | | |
| Other (.1") | <4.94 | >4.94 | >24.7 | <19.2 | >19.2 | >96 | | | |
| Incorporation | | | | | | | | | |
| 1" | | | | | | | | | |
| 2" | | | | | | | | | |
| 3" | | | | | | | | | |
| >3" | | | | | | | | | |
| <u>Aquatic Application</u> | | | | | | | | | |
| 6" Layer H ₂ O | | | | | | | <0.00048 | >0.00048 | >0.002 |
| Other | | | | | | | | | |

Chemical: Dibrom/DDVP

CLASSIFICATION (Cont.)

| CHEMICAL | ORGANISM | GENERAL | RESTRICTED | RPAR |
|----------------|--|-------------------------------|-------------------------------|-------------------------------|
| Dibrom DDVP | Rat ^{1/} Rat ^{7/} | <1088 ppm <224 ppm | >1088 ppm ≥224 ppm | >5440 ppm ≥1120 ppm |
| Dibrom DDVP | Pheasant ^{2/} Pheasant ^{2/} | <507.6 ppm <113.6 ppm | >507.6 ppm ≥113.6 ppm | >2538 ppm ≥568 ppm |
| Dibrom DDVP | Mallard ^{2/} Mallard ^{2/} | <544.8 ppm <263.4 ppm | >544.8 ppm ≥263.4 ppm | >2724 ppm ≥1317 ppm |
| Dibrom DDVP | Rainbow ^{3/} Rainbow ^{8/} | <0.015 ppm <0.010 ppm | >0.015 ppm ≥0.010 ppm | >0.075 ppm >0.050 ppm |
| Dibrom DDVP | Bluegill ^{3/} Bluegill ^{5/} | <0.018 ppm <0.070 ppm | >0.018 ppm ≥0.070 ppm | >0.09 ppm >0.35 ppm |
| Dibrom DDVP | Mallard ^{4/} Mallard ^{4/} | <10.44 mg/kg <1.56 mg/kg | >10.44 mg/kg ≥1.56 mg/kg | >52.2 mg/kg ≥7.8 mg/kg |
| Dibrom DDVP | Daphnia ^{5/} Daphnia ^{5/} | <0.00035 ppm <0.000007 ppm | >0.00035 ppm ≥0.000007 ppm | >0.00175 ppm >0.000035 ppm |
| Dibrom DDVP | Stone fly ^{5/} Stone fly ^{5/} | <0.0016 ppm <0.001 ppm | >0.0016 ppm ≥0.001 ppm | >0.008 ppm >0.005 ppm |
| Dibrom DDVP | Amphipod ^{5/} Amphipod ^{5/} | <0.016 ppm <0.0001 ppm | >0.016 ppm ≥1.0001 ppm | >0.08 ppm >0.0005 ppm |

CLASSIFICATION

| PARAMETERS | ORGANISM | GENERAL | RESTRICTED | REBUTTABLE PRESUMPTION |
|------------|--|---|---|--|
| A | MAMMAL | $< 1/5 LD_{50}$ | $\geq 1/5 LD_{50}$ to $< LD_{50}$ | $\geq LD_{50}$ |
| | Rat ^{7/} | $< 1/5 (56 \text{ mg/kg or } 1120 \text{ ppm}) =$ $< 224 \text{ ppm}$ | $\geq 224 \text{ ppm}$ to $< 1120 \text{ ppm}$ | $\geq 1120 \text{ ppm}$ |
| B | AVIAN | $< 1/5 LC_{50}$ | $\geq 1/5 LC_{50}$ to $< LC_{50}$ | $\geq LC_{50}$ |
| | Pheasant ^{2/} Mallard ^{2/} | $< 1/5 (568 \text{ ppm}) =$ $< 113.6 \text{ ppm}$ $< 1/5 (1317 \text{ ppm}) = < 263.4 \text{ ppm}$ | $\geq 113.6 \text{ ppm}$ to $< 568 \text{ ppm}$ $\geq 263.4 \text{ ppm}$ to $< 1317 \text{ ppm}$ | $\geq 568 \text{ ppm}$ $\geq 1317 \text{ ppm}$ |
| C | AQUATIC* | $< 1/10 LC_{50}$ | $\geq 1/10 LC_{50}$ to $1/2 LC_{50}$ | $> 1/2 LC_{50}$ |
| | Rainbow ^{8/} Bluegill ^{5/} | $< 1/10 (0.10 \text{ ppm}) =$ $< 0.010 \text{ ppm}$ $< 1/10 (0.70 \text{ ppm}) = < 0.070 \text{ ppm}$ | $\geq 0.01 \text{ ppm}$ to 0.05 ppm $\geq 0.07 \text{ ppm}$ to 0.35 ppm | $> 0.05 \text{ ppm}$ $> 0.35 \text{ ppm}$ |
| D | The pesticide causes, under conditions of label use, or widespread and commonly recognized practice of use, only minor and no discernible adverse effects on the physiology, growth, population levels, or reproduction rates of non-target organisms, resulting from exposure to the product ingredients, their metabolites or degradation products, whether due to direct application or otherwise resulting from application such as through volatilization, drift, leaching or lateral movement in soil. | | | Chronic Toxicity: Can reasonably be anticipated to result in significant local, regional, or national population reductions in non-target organisms, or fatality to members of endangered species. |

*used only in cases where "direct application" to water is intended. (See W. Preston's Memo of January 14, 1976.)

Chemical DDVP

RESIDUE CRITERIA - ENVIRONMENTAL

Rat LD₅₀ = 56 mg/kg
Bird LC₅₀ = 568 ppmFish Daphnia LC₅₀ = 0.00007

APPLICATION RATE (LBS/A a.i.)

MAMMAL

AQUATIC

| FEED/WATER Foliar Application | MAMMAL | | | | AQUATIC | | | |
|----------------------------------|---------|------------|---------|---------|------------|---------|-------------|-------------|
| | General | Restricted | RPAR | General | Restricted | RPAR | General | Restricted |
| Forage | < 3.0 | > 3.9 | > 19.5 | < 1.95 | > 1.95 | > 9.75 | | |
| Leafy Crop | < 1.8 | > 1.8 | > 9.0 | < 0.92 | > 0.92 | > 4.6 | | |
| Grass - Long | < 2.05 | > 2.05 | > 10.25 | < 1.04 | > 1.04 | > 5.2 | | |
| Grass - Short | < 0.94 | > 0.094 | > 4.7 | < 0.047 | > 0.47 | > 2.35 | | |
| Ornamentals | < 11.7 | > 11.7 | > 58.5 | < 5.85 | > 5.85 | > 29.25 | | |
| Trees | < 33 | > 33 | > 165 | < 16.4 | > 16.4 | > 82 | | |
| Fruit, Seeds, Insects | < 19 | > 19 | > 95 | < 9.6 | > 9.6 | > 48 | | |
| Soil Application | | | | | | | | |
| No Incorporation | | | | | | | | |
| Granular (mg/ft ²) | | | | | | | | |
| Other (.1") | < 10.16 | > 10.16 | > 50.8 | < 5.15 | > 5.15 | > 25.75 | | |
| Incorporation | | | | | | | | |
| 1" | | | | | | | | |
| 2" | | | | | | | | |
| 3" | | | | | | | | |
| > 3" | | | | | | | | |
| Aquatic Application | | | | | | | | |
| 6" Layer H ₂ O | | | | | | | < 0.0000092 | > 0.0000092 |

> 0.000046

(Dibrom breaks down to DDVP) A Comparison of Toxicity of Dibrom and DDVP

| CHEMICAL | ① | ② | ③ | ④ | ⑤ | ⑥ | ⑦ | ⑧ | ⑨ | ⑩ |
|----------|----------------------|-----------------------|--------------------------|--------------------------|--------------------------|------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| | (acute oral) | MALLARD Acute | BOBWHITE | PHEASANT | MALLARD | RAINBOW | DAPHNIA | STONEFLY | AMPHIPOD | BLUEGILL |
| | RAT LD ₅₀ | Oral LD ₅₀ | dietary LC ₅₀ | dietary LC ₅₀ | dietary LC ₅₀ | 96-hr LC ₅₀ | 48-hour LC ₅₀ | 48-hour LC ₅₀ | 48-hour LC ₅₀ | 96-hour LC ₅₀ |
| Dibrom | 272 mg/kg | 52.2 mg/kg | 2117 ppm | 2538 ppm | 2724 ppm | 0.15 ppm | 0.0035 ppm | 0.016 ppm | 0.16 ppm | 0.180 ppm |
| DDVP | 56-80 mg/kg | 7.8 mg/kg | ----- | 568 ppm | 1317 ppm | 0.10 ppm | 0.00007 ppm | 0.010 ppm | 0.001 ppm | 0.70 ppm |